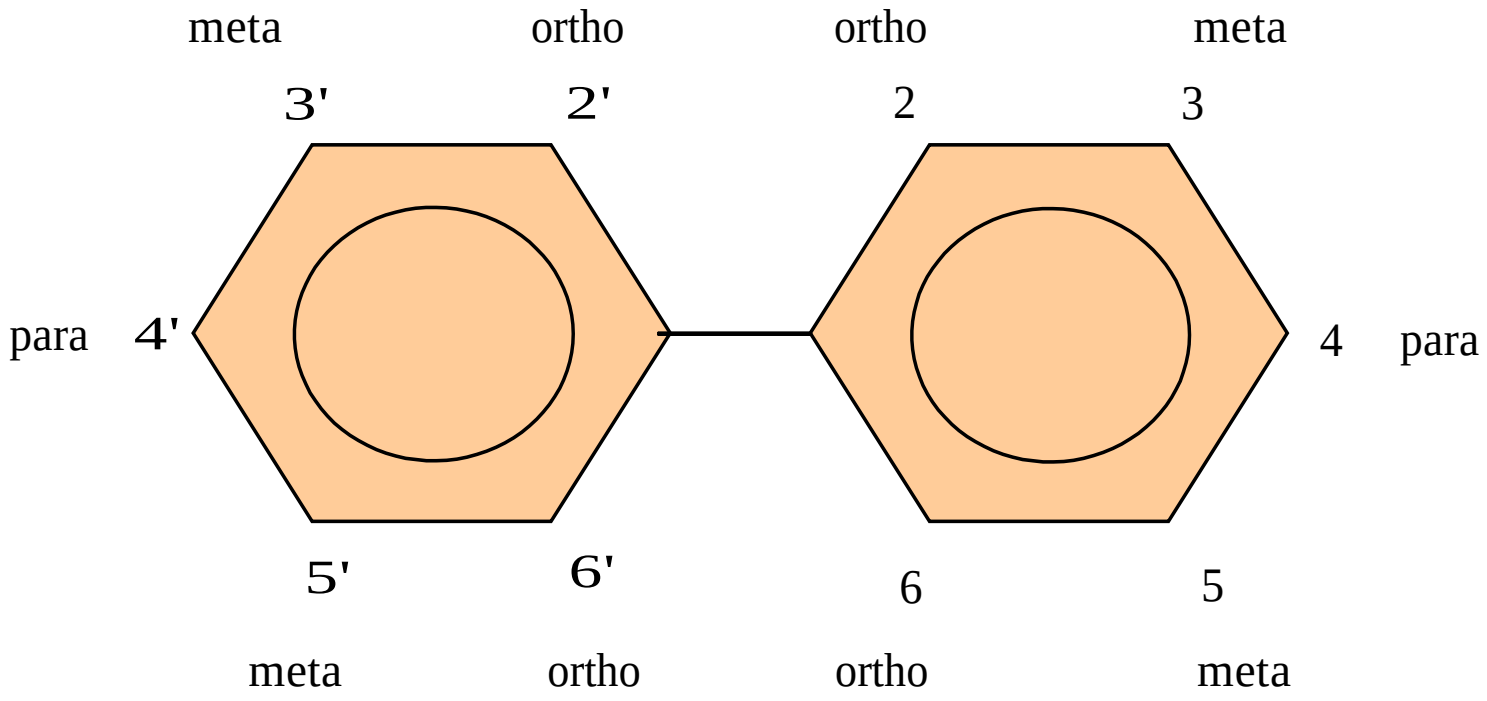
PCB Plan

Former Pechiney Cast Plate Facility
PUBLIC MEETING
June 7, 2012

Patrick Wilson, Ph.D., M.P.H.
Senior Regional Toxicologist
U.S. Environmental Protection Agency
Region IX
San Francisco

PCB Molecular Structure



Structure of Polychlorinated Biphenyl (PCB) Molecule

Why Were PCBs Banned??

- **Persistent in the environment**
- **Bioaccumulation and bioconcentration effects**
- **Found in virtually all human fat tissue**
  - Humans 2300 ng/g (ppb)
  - Human Breast Milk 1200 ng/g (ppb)

Toxicities of Concern

- Cancer
- Non-cancer Toxicity
  - Kidney
  - Liver
  - Skin
  - Immune System
  - Nervous System
  - Developmental\Reproductive System

Key Concepts

- **Polychlorinated biphenyls (PCBs):** a mixture of compounds containing the biphenyl structure with varying numbers (i.e., one to ten) and arrangements of chlorine atoms attached.

- **Aroclor:** One of nine commercial PCB mixtures, with varying levels of chlorination, formerly produced in the United States. The percent of chlorine content varies across the different Aroclors, depending on their intended uses. Generally, samples of pure Aroclor exhibit a distinct pattern of congener concentrations, but transformations during routine use and/or weathering can alter these patterns.

Key Concepts

- **Congener:** One of the 209 possible PCB molecules, each distinguished by the number and arrangement of chlorine atoms. Commercially-produced PCB mixtures collectively include about 175 congeners, some at concentrations so low they are not detectable in environmental samples. One hundred and ten of the 209 congeners typically constitute 98 percent of PCB mass measured in samples.

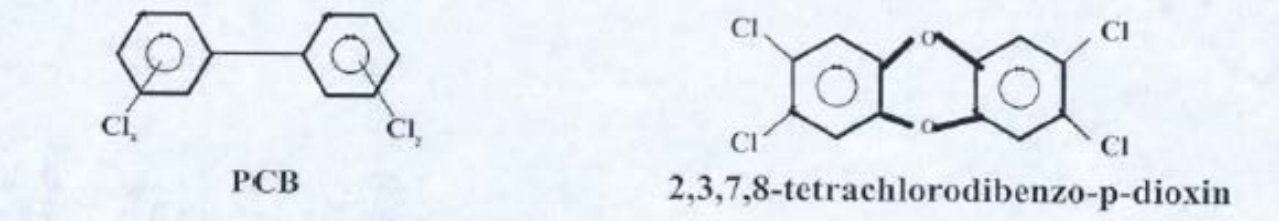
- **Dioxin-Like Congener:** One of 12 PCB congeners that exhibits toxicity similar to that of dioxin as the result of structural similarity to 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). The 12 dioxin-like PCB congeners are: 77, 81, 105, 114, 118, 123, 126, 156, 157, 167, 169 and 189.

Key Concepts

- **Dioxins and Furans:** Two families of chemicals related by their similar physical and biological characteristics. Several hundred different compounds exist among the chlorinated dibenzo-*p*-dioxins (CDDs) and the chlorinated dibenzofurans (CDFs). The term “dioxin” is often used to refer to the most toxic dioxin compound, 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD). CDDs and CDFs are products of combustion created by anthropogenic activities and natural processes.

- **Weathering**: Physical, biological, or chemical processes that can alter the chlorination pattern of a PCB molecule, and thereby change the congener composition of environmental mixtures of PCBs

How Are PCBs and Dioxins Related?



- Chemical structural similarity
  - Dioxin-like PCBs pr Coplanar PCBs (CPCBs) are similar dioxins
  - Preliminary test data indicate correlation between chemical structure and toxicity
- Products of Incomplete Combustion (PICs) of PCBs
  - Dioxins
  - Dioxin-like chlorinated polycyclic aromatic hydrocarbons (PAHs)
- Presence of dioxins or dioxin-like chlorinated PAHs results in risk regardless of route of formation

U.S. EPA Regional Screening Level

U.S. EPA Industrial Exposure Scenario:

- 70 kg adult; 250 days/year exposure frequency; 25 year exposure duration; 8-hrs/day
- Target Cancer risk: 1 excess case per 100,000 exposed
- 7.4 ppm PCB (total Aroclors) = Industrial Screening Level for soil
- Pechiney Site-Specific PCB Cleanup Goal: 3.5 ppm for soils & concrete